

EXHIBIT T

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

TQ DELTA, LLC,

Plaintiff,
v.
**COMMSCOPE HOLDING COMPANY, INC.,
COMMSCOPE INC., ARRIS
INTERNATIONAL LIMITED, ARRIS
GLOBAL LTD., ARRIS US HOLDINGS, INC.,
ARRIS SOLUTIONS, INC., ARRIS
TECHNOLOGY, INC., and ARRIS
ENTERPRISES, LLC**

Defendants.

CIV. A. NO. 2:21-CV-310-JRG
(Lead Case)

TQ DELTA, LLC,

Plaintiff,
v.
**NOKIA CORP., NOKIA SOLUTIONS AND
NETWORKS OY, and NOKIA OF AMERICA
CORP.,**

Defendants.

CIV. A. NO. 2:21-CV-309-JRG
(Member Case)

NOKIA DEFENDANTS' INITIAL INVALIDITY CONTENTIONS

Pursuant to this Court's Docket Control Order (Dkt. No. 62), Nokia Defendants Nokia Corporation, Nokia Solutions and Networks Oy, and Nokia of America Corporation (collectively, "Nokia" or "Nokia Defendants") respectfully submits these invalidity contentions and an accompanying document production with respect to the claims identified by Plaintiff TQ Delta, LLC ("TQ Delta") in its Preliminary Infringement Contentions.

of their knowledge as persons of ordinary skill in the art. Thus, to understand and interpret any specific statement or disclosure within a prior art reference, such persons would rely on other information within the reference, along with other publications and their general scientific knowledge and experience in the field. Thus, each prior art reference identified herein should be understood in the context of the reference itself, in conjunction with anything incorporated by reference or described as relevant technology by the reference, any documents that are referred to for further understanding by the reference, any system embodying the reference, and any testimony by those with knowledge of the reference, such as the named authors and inventors. The Nokia Defendants may rely on uncited portions of the prior art references and on other publications and expert testimony to provide context, and as aids to understanding and interpreting the portions that are cited. The Nokia Defendants may also rely on uncited portions of the prior art references, other disclosed publications, and the testimony of experts to establish that a person of ordinary skill in the art would have been motivated to modify or combine certain of the cited references so as to render the claims obvious.

1. The Family 1 Patent Priority Date.

TQ Delta's Preliminary Infringement Contentions allege that the Asserted Claims of the Family 1 Patent are entitled at least to the priority date January 7, 2000, or in the alternative, August 10, 2000, or in the alternative, January 8, 2001. To the extent TQ Delta alleges that any prior art relied on in these invalidity contentions does not qualify as prior art to an Asserted Patent, Nokia Defendants reserve the right to rebut those allegations (*e.g.*, by demonstrating an earlier relevant date for the challenged prior art and/or a later priority date for the Asserted Patent and/or Asserted Claim).

2. The Family 1 Patent Is Anticipated and/or Rendered Obvious by the Prior Art.

Some or all of the Asserted Claims of the Family 1 Patent are invalid as anticipated and/or rendered obvious under 35 U.S.C. §§ 102 and/or 103 in view of each of the primary prior art references identified in the claim charts included in Exhibits F1-686A – F1-686K, which identify specific examples of where each limitation of the Asserted Claims is found in the prior art references. As explained above, the cited portions of prior art references identified in the attached claim charts are exemplary in nature and representative of the content and teaching of the prior art references, and should be understood in the context of the reference as a whole and as they would be understood by a person of ordinary skill in the art.

Nokia Defendants identify the following references as anticipating and/or rendering obvious one or more of the Asserted Claims of the Family 1 Patent under 35 U.S.C. §§ 102 and/or 103. The table of anticipating and/or rendering obvious references below is exemplary, and it does not constitute an admission that any reference not listed below does not also anticipate and/or render obvious the claims of the Family 1 Patent. Further, Nokia Defendants contend that any prior art reference in the attached charts that is charted for each limitation of any given claim, anticipates that claim, regardless of whether that prior art reference is listed in the following table.

Exhibit	Primary Prior Art	Date¹
F1-686A	U.S. Patent No. 6,606,719 to Ryckebusch (“Ryckebusch”)	March 31, 1999
F1-686B	U.S. Patent No. 6,445,730 to Greszczuk (“Greszczuk”)	January 26, 1998

¹ Nokia Defendants reserve the right to identify additional bases for qualification as prior art for each of the identified references in the event that it is determined that the Asserted Patents are not entitled to the claimed priority date.

Exhibit	Primary Prior Art	Date¹
F1-686C	U.S. Patent No. 6,788,705 to “Rango”	January 18, 2000
F1-686D	U.S. Patent No. 6,636,603 to Milbrandt (“Milbrandt 603”)	July 30, 1999
F1-686E	U.S. Patent No. 4,679,227 to Hughes-Hartogs (“Hughes-Hartogs”)	May 20, 1985
F1-686F	Telebit 2500 (“Telebit 2500”)	1990
F1-686G	U.S. Patent No. 6,219,378 to Wu (“Wu”)	September 17, 1997
F1-686H	Network and Customer Installation Interfaces – Asymmetric Digital Subscriber Line (ADSL) Metallic Interface (“T1.413-1998”)	November 11, 1998
F1-686I	SAD-Golden ATU-C (“Golden ATU”)	May 5, 1999
F1-686J	U.S. Patent No. 6,434,119 to Wiese (“Wiese”)	July 7, 1998
F1-686K	Speed Touch ADSL Modem (“Speed Touch”)	1999

To the extent any item of prior art cited above is deemed not to disclose and/or render obvious, explicitly or inherently, any limitation of an Asserted Claim of the Family 1 Patent, Nokia Defendants reserve the right to argue that any difference between that prior art and the corresponding patent claim would have been either inherent in the art or obvious to a person of

ordinary skill in the art, even if Nokia Defendants have not specifically denoted that the art is to be combined with the knowledge of a person of ordinary skill in the art.

3. The Family 1 Patent Is Obvious Over the Prior Art.

To the extent TQ Delta argues that any limitation of the Asserted Claims of the Family 1 Patent are not explicitly disclosed and/or rendered obvious by an item of prior art identified above and in Exhibits F1-686A – F1-686K and F1 Secondary-686, any purported differences are such that the claimed subject matter as a whole would have been obvious to one skilled in the art at the time of the alleged invention, in view of the state of the art and knowledge of those skilled in the art. The item of prior art would, therefore, render such claims invalid as obvious under 35 U.S.C. § 103.

a) The Claims Are Obvious Over the Primary References in Light of One or More Secondary References.

To the extent the foregoing references are found not to anticipate and/or render obvious the Asserted Claims of the Family 1 Patent, the foregoing references render the Asserted Claims obvious, either alone or in combination with one or more of the other references identified above. One of ordinary skill in the art would have been motivated to combine the various references cited above and herein so as to disclose each and every limitation of the Asserted Claims of the Family 1 Patent.

Prior art references rendering the Asserted Claims of the Family 1 Patent obvious, either alone or in combination with other references in Exhibits F1-686A – F1-686K and F1 Secondary-686, are provided in the tables above and below and in Exhibits F1-686A – F1-686K and F1 Secondary-686. The prior art identified in Exhibits F1-686A – F1-686K render one or more asserted claims of the Family 1 Patent obvious when the references are read in combination with one or more of each other, when read in combination with any of the prior art identified in Exhibit

F1 Secondary-686, and/or when read in view of the state of the art and knowledge of those skilled in the art.

F1 Secondary Exhibit	Date
U.S. Patent No. 6,590,893 to Hwang (“Hwang”)	April 7, 1999
U.S. Patent No. 6,366,644 to Sisk (“Sisk”)	September 15, 1997
U.S. Patent No. 6,865,232 to Isaksson (“Isaksson”)	July 15, 1997
U.S. Patent No. 4,438,511 to Baran (“Baran”)	November 10, 1980
U.S. Patent No. 5,838,268 to Frenkel (“Frenkel”)	March 14, 1997
U.S. Patent No. 6,891,803 to Chang (“Chang”)	December 18, 1998
U.S. Provisional Application 60/078,549 to Jacobsen (“Jacobsen”)	March 19, 1998
Network and Customer Installation Interfaces – Asymmetric Digital Subscriber Line (ADSL) Metallic Interface (“T1.413-1995”)	August 18, 1995
Series G: Transmission Systems and Media, Digital Systems and Networks (“G.992.1”)	June 22, 1999
Data Communications Networking Devices: Operation, Utilization and LAN and WAN Internetworking, 4 th Edition, by Gilbert Held (“Held”)	January 1999
ADSL Forum Technical Report TR-024 (“TR-024”)	June 1999

To the extent TQ Delta argues that any Asserted Claim of the Family 1 Patent is not disclosed or rendered obvious by any Exhibits F1-686A – F1-686K and F1 Secondary-686 reference, the Asserted Claims nevertheless would have been obvious in light of one or more other Exhibits F1-686A – F1-686K references and/or one or more references identified and charted in Exhibits F1 Secondary-686 and in view of the knowledge, experience, and understanding of persons of ordinary skill in the art.

Each and every reference identified is also relevant to the state of the art at the time of the alleged invention. Any of the references disclosed above may be combined with another to render obvious (and therefore invalid) each of TQ Delta's Asserted Claims. Nokia Defendants may rely on a subset of (or all of) the above-identified references, including all references in Exhibits F1-686A – F1-686K and F1 Secondary-686, for purposes of obviousness depending on the Court's claim construction, positions taken by TQ Delta during this litigation, and further investigation and discovery.

b) Exemplary Combinations of the Prior Art.

The table below provides an identification of exemplary combinations of prior art references that, based on Nokia Defendants' present understanding of TQ Delta's Preliminary Infringement Contentions and apparent reading of the Asserted Claims, render obvious one or more of the Asserted Claims of the Family 1 Patent. The combinations of references identified below are non-exhaustive, and additional examples are apparent from other combinations of references addressed in Exhibits F1-686A – F1-686K and F1 Secondary-686. Nokia Defendants expressly note that, although certain references charted in Exhibits F1-686A – F1-686K are listed variously in the left or right column below, Nokia Defendants do not thereby imply any restriction

expert testimony to provide context, and as aids to understanding and interpreting the portions that are cited. Nokia Defendants may also rely on uncited portions of the prior art references, other disclosed publications, and the testimony of experts to establish that a person of ordinary skill in the art would have been motivated to modify or combine certain of the cited references so as to render the claims obvious.

1. The Family 2 Patents Priority Date.

TQ Delta's Preliminary Infringement Contentions allege that the Asserted Claims of the Family 2 Patents are entitled at least to the priority date October 5, 2001, October 4, 2002, or October 8, 2008. To the extent TQ Delta alleges that any prior art relied on in these invalidity contentions does not qualify as prior art to an Asserted Patent, Nokia Defendants reserve the right to rebut those allegations (*e.g.*, by demonstrating an earlier relevant date for the challenged prior art and/or a later priority date for the Asserted Patent and/or Asserted Claim).

2. The Family 2 Patents Are Anticipated and/or Rendered Obvious by the Prior Art.

Some or all of the Asserted Claims of the Family 2 Patents are invalid as anticipated and/or rendered obvious under 35 U.S.C. §§ 102 and/or 103 in view of each of the primary prior art references identified in the claim charts included in Exhibits F2-193A - F2-193F, F2-601A – F2-601F, F2-014A – F2-014F, which identify specific examples of where each limitation of the Asserted Claims is found in the prior art references. As explained above, the cited portions of prior art references identified in the attached claim charts are exemplary in nature and representative of the content and teaching of the prior art references, and should be understood in the context of the reference as a whole and as they would be understood by a person of ordinary skill in the art.

The Nokia Defendants identify the following references as anticipating and/or rendering obvious one or more of the Asserted Claims of the Family 2 Patents under 35 U.S.C. §§ 102 and/or

103. The table of anticipating and/or rendering obvious references below is exemplary, and it does not constitute an admission that any reference not listed below does not also anticipate and/or render obvious the claims of the Family 2 Patents. Further, Nokia Defendants contend that any prior art reference in the attached charts that is charted for each limitation of any given claim, anticipates that claim, regardless of whether that prior art reference is listed in the following table.

Exhibit	Primary Prior Art	Date
F2-014A F2-193A F2-601A	U.S. Patent No. 6,222,858 to Counterman (“Counterman”)	February 10, 1999
F2-014B F2-193B F2-601B	U.S. Patent No. 7,068,657 to Keller-Tuberg (“Keller-Tuberg”)	April 24, 2001
F2-014C F2-193C F2-601C	WO 99/39468 to Edvardsen (“Edvardsen”)	August 5, 1999
F2-014D F2-193D F2-601D	ATM Forum Technical Committee issued its Inverse Multiplexing over ATM (IMA) Specification Version 1.0, AF-PHY-0086.000, July 1997 (“IMA Specification 1.0”)	July 1997
F2-014E F2-193E F2-601E	U.S. Patent No. 8,178,448 to Gray (“Gray”)	June 18, 1997
F2-014F F2-193F F2-601F	U.S. Patent No. 5,799,014 to Kozaki (“Kozaki”)	September 16, 1994, or, in the alternative, August 25, 1998

To the extent any item of prior art cited above is deemed not to disclose and/or render obvious, explicitly or inherently, any limitation of an Asserted Claim of the Family 2 Patents, the Nokia Defendants reserve the right to argue that any difference between that prior art and the corresponding patent claim would have been either inherent in the art or obvious to a person of ordinary skill in the art, even if Nokia Defendants have not specifically denoted that the art is to be combined with the knowledge of a person of ordinary skill in the art.

3. The Family 2 Patents Are Obvious Over the Prior Art.

To the extent TQ Delta argues that any limitation of the Asserted Claims of the Family 2 Patents are not explicitly disclosed and/or rendered obvious by an item of prior art identified above and in Exhibits F2-193A - F2-193F, F2-601A – F2-601F, F2-014A – F2-014F and F2 Secondary-193, F2 Secondary-601, F2 Secondary - 014, any purported differences are such that the claimed subject matter as a whole would have been obvious to one skilled in the art at the time of the alleged invention, in view of the state of the art and knowledge of those skilled in the art. The item of prior art would, therefore, render such claims invalid as obvious under 35 U.S.C. § 103.

a) The Claims Are Obvious Over the Primary References in Light of One or More Secondary References.

To the extent the foregoing references are found not to anticipate and/or render obvious the Asserted Claims of the Family 2 Patents, the foregoing references render the Asserted Claims obvious, either alone or in combination with one or more of the other references identified above. One of ordinary skill in the art would have been motivated to combine the various references cited above and herein so as to disclose each and every limitation of the Asserted Claims of the Family 2 Patents.

Prior art references rendering the Asserted Claims of the Family 2 Patents obvious, either alone or in combination with other references in Exhibits F2-193A - F2-193F, F2-601A – F2-

601F, F2-014A – F2-014F and F2 Secondary-193, F2 Secondary-601, F2 Secondary - 014, are provided in the tables above and below and in Exhibits F2-193A - F2-193F, F2-601A – F2-601F, F2-014A – F2-014F and F2 Secondary-193, F2 Secondary-601, F2 Secondary - 014. The prior art identified in Exhibits F2-193A - F2-193F, F2-601A – F2-601F, F2-014A – F2-014F render one or more asserted claims of the Family 2 Patents obvious when the references are read in combination with one or more of each other, when read in combination with any of the prior art identified in F2 Secondary-193, F2 Secondary-601, F2 Secondary - 014, and/or when read in view of the state of the art and knowledge of those skilled in the art.

F2 Secondary Exhibits	Date
ITU-T Recommendation G.992.1 (06/99) (“ITU-T G.992.1”)	June 1999
ITU-T Recommendation G.997.1 (06/99) (“ITU-T G.997.1”)	June 1999
U.S. Patent No. 6,002,670 to Rahman (“Rahman”)	December 12, 1997
U.S. Patent No. 6,956,872 to Djokovic (“Djokovic”)	August 18, 2000
U.S. Patent No. 6,665,733 to Witkowski (“Witkowski”)	September 23, 1997
U.S. Patent No. 6,772,388 to Cooper (“Cooper”)	December 6, 2000

To the extent TQ Delta argues that any Asserted Claim of the Family 2 Patents is not disclosed or rendered obvious by any Exhibits F2-193A - F2-193F, F2-601A – F2-601F, F2-014A – F2-014F, the Asserted Claims nevertheless would have been obvious in light of one or more other Exhibits F2-193A - F2-193F, F2-601A – F2-601F, F2-014A – F2-014F references and/or one or more references identified and charted in Exhibits F2 Secondary-193, F2 Secondary-601,

F2 Secondary - 014 and in view of the knowledge, experience, and understanding of persons of ordinary skill in the art.

Each and every reference identified is also relevant to the state of the art at the time of the alleged invention. Any of the references disclosed above may be combined with another to render obvious (and therefore invalid) each of TQ Delta's Asserted Claims. The Nokia Defendants may rely on a subset of (or all of) the above-identified references, including all references in Exhibits F2-193A - F2-193F, F2-601A – F2-601F, F2-014A – F2-014F and F2 Secondary-193, F2 Secondary-601, F2 Secondary - 014, for purposes of obviousness depending on the Court's claim construction, positions taken by TQ Delta during this litigation, and further investigation and discovery.

b) Exemplary Combinations of the Prior Art.

The table below provides an identification of exemplary combinations of prior art references that, based on Nokia Defendants' present understanding of TQ Delta's Preliminary Infringement Contentions and apparent reading of the Asserted Claims, render obvious one or more of the Asserted Claims of the Family 2 Patents. The combinations of references identified below are non-exhaustive, and additional examples are apparent from other combinations of references addressed in Exhibits F2-193A - F2-193F, F2-601A – F2-601F, F2-014A – F2-014F and F2 Secondary-193, F2 Secondary-601, F2 Secondary - 014. Nokia Defendants expressly note that, although certain references charted in Exhibits F2-193A - F2-193F, F2-601A – F2-601F, F2-014A – F2-014F are listed variously in the left or right column below, Nokia Defendants do not thereby imply any restriction as to which Exhibits F2-193A - F2-193F, F2-601A – F2-601F, F2-014A – F2-014F reference is primary and which Exhibits F2-193A - F2-193F, F2-601A – F2-601F, F2-014A – F2-014F reference is secondary in such a combination. The Nokia Defendants

reserve the right to rely on either identified reference in the identified combinations as a primary and/or secondary reference.

Reference	Combination References
U.S. Patent No. 6,222,858 to Counterman (“Counterman”)	Keller-Tuberg, Edvardsen, IMA Specification 1.0, Gray, Kozaki, and/or one or more references as charted in F2 Secondary-193, F2 Secondary-601, and F2 Secondary - 014
U.S. Patent No. 7,068,657 to Keller-Tuberg (“Keller-Tuberg”)	Counterman, Edvardsen, IMA Specification 1.0, Gray, Kozaki, and/or one or more references as charted in Exhibit F2 Secondary-193, F2 Secondary-601, and F2 Secondary - 014
WO 99/39468 to Edvardsen (“Edvardsen”)	Counterman, Keller-Tuberg, IMA Specification 1.0, Gray, Kozaki, and/or one or more references as charted in Exhibit F2 Secondary-193, F2 Secondary-601, and F2 Secondary - 014
ATM Forum Technical Committee issued its Inverse Multiplexing over ATM (IMA) Specification Version 1.0, AF-PHY-0086.000, July 1997 (“IMA Specification 1.0”)	Counterman, Keller-Tuberg, Edvardsen, Gray, Kozaki, and/or one or more references as charted in Exhibit F2 Secondary-193, F2 Secondary-601, and F2 Secondary - 014
U.S. Patent No. 8,178,448 to Gray (“Gray”)	Counterman, Keller-Tuberg, Edvardsen, IMA Specification 1.0, Kozaki, and/or one or more references as charted in Exhibit F2 Secondary-193, F2 Secondary-601, and F2 Secondary - 014
U.S. Patent No. 5,799,014 to Kozaki (“Kozaki”)	Counterman, Keller-Tuberg, Edvardsen, IMA Specification 1.0, Gray, and/or one or more references as charted in Exhibit F2 Secondary-193, F2 Secondary-601, and F2 Secondary - 014

It would have been obvious to combine these references for reasons that are readily apparent to one of ordinary skill in the art, and for reasons explained herein.

for further understanding by the reference, any system embodying the reference, and any testimony by those with knowledge of the reference, such as the named authors and inventors. Nokia Defendants may rely on uncited portions of the prior art references and on other publications and expert testimony to provide context, and as aids to understanding and interpreting the portions that are cited. Nokia Defendants may also rely on uncited portions of the prior art references, other disclosed publications, and the testimony of experts to establish that a person of ordinary skill in the art would have been motivated to modify or combine certain of the cited references so as to render the claims obvious.

1. The Family 4 Patent Priority Date.

TQ Delta's Preliminary Infringement Contentions allege that the Asserted Claim of the Family 4 Patent is entitled at least to the priority date of November 9, 1999 or, in the alternative, November 9, 2000 or, in the alternative, August 26, 2005, or in the alternative, September 28, 2007, or, in the alternative, October 22, 2008. To the extent TQ Delta alleges that any prior art relied on in these invalidity contentions does not qualify as prior art to an Asserted Patent, Nokia Defendants reserve the right to rebut those allegations (e.g., by demonstrating an earlier relevant date for the challenged prior art and/or a later priority date for the Asserted Patent and/or Asserted Claim).

2. The Family 4 Patent Is Anticipated and/or Rendered Obvious by the Prior Art.

The Asserted Claim of the Family 4 Patent is invalid as anticipated and/or rendered obvious under 35 U.S.C. §§ 102 and/or 103 in view of each of the primary prior art references identified in the claim charts included in Exhibits F4-008A – F4-008N, which identify specific examples of where each limitation of the Asserted Claim is found in the prior art references. As explained above, the cited portions of prior art references identified in the attached claim charts are

exemplary in nature and representative of the content and teaching of the prior art references, and should be understood in the context of the reference as a whole and as they would be understood by a person of ordinary skill in the art.

Nokia Defendants identify the following references as anticipating and/or rendering obvious the Asserted Claim of the Family 4 Patent under 35 U.S.C. §§ 102 and/or 103. The table of anticipating and/or rendering obvious references below is exemplary, and it does not constitute an admission that any reference not listed below does not also anticipate and/or render obvious the claim of the Family 4 Patent. Further, Nokia Defendants contend that any prior art reference in the attached charts that is charted for each limitation of any given claim, anticipates that claim, regardless of whether that prior art reference is listed in the following table.

Exhibit	Primary Prior Art	Date³
F4-008A	U.S. Patent No. 6,125,103 to Bauml (“Bauml”)	September 3, 1997
F4-008B	U.S. Patent No. 6,556,557 to Cimini (“Cimini”)	June 2, 1999
F4-008C	U.S. Patent No. 6,963,599 to Dunn (“Dunn”)	December 30, 1992
F4-008D	U.S. Patent No. 6,781,951 to Fifield (“Fifield”)	October 22, 1999
F4-008E	U.S. Patent No. 5,682,376 to Hayashino (“Hayashino”)	December 14, 1995
F4-008F	U.S. Patent No. 6,310,869 to Holtzman (“Holtzman”)	August 31, 1998
F4-008G	U.S. Patent No. 6,301,268 to Laroia (“Laroia”)	March 10, 1998

³ Nokia Defendants reserve the right to identify additional bases for qualification as prior art for each of the identified references in the event that it is determined that the Asserted Patents are not entitled to the claimed priority date.

Exhibit	Primary Prior Art	Date³
F4-008H	EP Patent No. 0743768 to Narahashi (“Narahashi”)	December 4, 1995
F4-008I	U.S. Patent No. 6,625,219 to Stopler (“Stopler”)	February 26, 1999
F4-008J	U.S. Patent No. 6,088,406 to Suzuki (“Suzuki 406”)	August 20, 1997
F4-008K	U.S. Patent No. 5,903,614 to Suzuki (“Suzuki 416”)	December 24, 1997
F4-008L	U.S. Patent No. 6,657,949 to Jones (“Jones”)	July 6, 1999
F4-008M	EP Patent No. 0895389 to Williams (“Williams”)	July 27, 1998
F4-008N	U.S. Patent No. 4,924,516 to Bremer (“Bremer”)	May 23, 1989

To the extent any item of prior art cited above is deemed not to disclose and/or render obvious, explicitly or inherently, any limitation of the Asserted Claim of the Family 4 Patent, Nokia Defendants reserve the right to argue that any difference between that prior art and the corresponding patent claim would have been either inherent in the art or obvious to a person of ordinary skill in the art, even if Nokia Defendants have not specifically denoted that the art is to be combined with the knowledge of a person of ordinary skill in the art.

3. The Family 4 Patent Is Obvious Over the Prior Art.

To the extent TQ Delta argues that any limitation of the Asserted Claim of the Family 4 Patent is not explicitly disclosed and/or rendered obvious by an item of prior art identified above and in Exhibits F4-008A – F4-008N and F4 Secondary-008, any purported differences are such that the claimed subject matter as a whole would have been obvious to one skilled in the art at the time of the alleged invention, in view of the state of the art and knowledge of those skilled in the

art. The item of prior art would, therefore, render such claims invalid as obvious under 35 U.S.C. § 103.

a) The Claims Are Obvious Over the Primary References in Light of One or More Secondary References.

To the extent the foregoing references are found not to anticipate and/or render obvious the Asserted Claim of the Family 4 Patent, the foregoing references render the Asserted Claim obvious, either alone or in combination with one or more of the other references identified above. One of ordinary skill in the art would have been motivated to combine the various references cited above and herein so as to disclose each and every limitation of the Asserted Claim of the Family 4 Patent.

Prior art references rendering the Asserted Claim of the Family 4 Patents obvious, either alone or in combination with other references in Exhibits F4-008A – F4-008N and F4 Secondary-008, are provided in the tables above and below and in Exhibits F4-008A – F4-008N and F4 Secondary-008. The prior art identified in Exhibits F4-008A – F4-008N render the Asserted Claim of the Family 4 Patent obvious when the references are read in combination with one or more of each other, when read in combination with any of the prior art identified in F4 Secondary-008, and/or when read in view of the state of the art and knowledge of those skilled in the art.

F4 Secondary Exhibits	Date
U.S. Patent No. 5,694,415 to Suzuki (“Suzuki 415”)	November 14, 1995
U.S. Patent No. 6,590,860 to Sakoda (“Sakoda”)	March 19, 1997
U.S. Patent No. 6,590,893 to Hwang (“Hwang”)	April 7, 1999
U.S. Patent No. 6,144,696 to Shively (“Shively”)	December 31, 1997

F4 Secondary Exhibits	Date
EP Patent No. 0552034 to Kaku (“Kaku”)	January 14, 1993
U.S. Prov. No. 60/164,134 (“AAPA-1”)	January 16, 2001
U.S. 7,292,627 (“AAPA-2”)	November 9, 2000
Par Reduction without Noise Enhancement T1E1.4/97-270 (“Djokovic”)	September 22, 1997
Standards Project for Interfaces Relating to Carrier Customer Connection of Asymmetrical Digital Subscriber Line (ADSL) Equipment (“T1.413-1998”)	June 5, 1998
Network and Customer Installation Interfaces – Asymmetric Digital Subscriber Line (ADSL) Metallic Interface (“T1.413-1995”)	August 18, 1995
Dynamic Power Save in xDSL Part 2: Impact on PMS-TC and PMD Layers (“T1E1.4/98-194”)	June 1, 1998

To the extent TQ Delta argues that the Asserted Claim of the Family 4 Patent is not disclosed or rendered obvious by any Exhibits F4-008A – F4-008N reference, the Asserted Claims nevertheless would have been obvious in light of one or more other Exhibits F4-008A – F4-008N references and/or one or more references identified and charted in Exhibits F4 Secondary-008, and in view of the knowledge, experience, and understanding of persons of ordinary skill in the art.

Each and every reference identified is also relevant to the state of the art at the time of the alleged invention. Any of the references disclosed above may be combined with another to render obvious (and therefore invalid) each of TQ Delta’s Asserted Claims. Nokia Defendants may rely

Reference	Combination References
U.S. Patent No. 6,125,103 to Bauml (“Bauml”)	Cimini, Dunn, Fifield, Hayashino, Holtzman, Laroia, Narahashi, Stopler, Suzuki 406, Suzuki 416, Jones, William, Bremer, and/or one or more references charted in Exhibit F4 Secondary-008
U.S. Patent No. 6,556,557 to Cimini (“Cimini”)	Bauml, Dunn, Fifield, Hayashino, Holtzman, Laroia, Narahashi, Stopler, Suzuki 406, Suzuki 416, Jones, William, Bremer, and/or one or more references charted in Exhibit F4 Secondary-008
U.S. Patent No. 6,963,599 to Dunn (“Dunn”)	Bauml, Cimini, Fifield, Hayashino, Holtzman, Laroia, Narahashi, Stopler, Suzuki 406, Suzuki 416, Jones, William, Bremer, and/or one or more references charted in Exhibit F4 Secondary-008
U.S. Patent No. 6,781,951 to Fifield (“Fifield”)	Bauml, Cimini, Dunn, Hayashino, Holtzman, Laroia, Narahashi, Stopler, Suzuki 406, Suzuki 416, Jones, William, Bremer, and/or one or more references charted in Exhibit F4 Secondary-008
U.S. Patent No. 5,682,376 to Hayashino (“Hayashino”)	Bauml, Cimini, Dunn, Fifield, Holtzman, Laroia, Narahashi, Stopler, Suzuki 406, Suzuki 416, Jones, William, Bremer, and/or one or more references charted in Exhibit F4 Secondary-008
U.S. Patent No. 6,310,869 to Holtzman (“Holtzman”)	Bauml, Cimini, Dunn, Fifield, Hayashino, Laroia, Narahashi, Stopler, Suzuki 406, Suzuki 416, Jones, William, Bremer, and/or one or more references charted in Exhibit F4 Secondary-008
U.S. Patent No. 6,301,268 to Laroia (“Laroia”)	Bauml, Cimini, Dunn, Fifield, Hayashino, Holtzman, Narahashi, Stopler, Suzuki 406, Suzuki 416, Jones, William, Bremer, and/or one or more references charted in Exhibit F4 Secondary-008

EP Patent No. 0743768 to Narahashi (“Narahashi”)	Bauml, Cimini, Dunn, Fifield, Hayashino, Holzman, Laroia, Stopler, Suzuki 406, Suzuki 416, Jones, William, Bremer, and/or one or more references charted in Exhibit F4 Secondary-008
U.S. Patent No. 6,625,219 to Stopler (“Stopler”)	Bauml, Cimini, Dunn, Fifield, Hayashino, Holzman, Laroia, Narahashi, Suzuki 406, Suzuki 416, Jones, William, Bremer, and/or one or more references charted in Exhibit F4 Secondary-008
U.S. Patent No. 6,088,406 to Suzuki (“Suzuki 406”)	Bauml, Cimini, Dunn, Fifield, Hayashino, Holzman, Laroia, Narahashi, Stopler, Suzuki 416, Jones, William, Bremer, and/or one or more references charted in Exhibit F4 Secondary-008
U.S. Patent No. 5,903,614 to Suzuki (“Suzuki 416”)	Bauml, Cimini, Dunn, Fifield, Hayashino, Holzman, Laroia, Narahashi, Stopler, Suzuki 406, Jones, William, Bremer, and/or one or more references charted in Exhibit F4 Secondary-008
U.S. Patent No. 6,657,949 to Jones (“Jones”)	Bauml, Cimini, Dunn, Fifield, Hayashino, Holzman, Laroia, Narahashi, Stopler, Suzuki 406, Suzuki 416, William, Bremer, and/or one or more references charted in Exhibit F4 Secondary-008
EP Patent No. 0895389 to Williams (“Williams”)	Bauml, Cimini, Dunn, Fifield, Hayashino, Holzman, Laroia, Narahashi, Stopler, Suzuki 406, Suzuki 416, Jones, Bremer, and/or one or more references charted in Exhibit F4 Secondary-008
U.S. Patent No. 4,924,516 to Bremer (“Bremer”)	Bauml, Cimini, Dunn, Fifield, Hayashino, Holzman, Laroia, Narahashi, Stopler, Suzuki 406, Suzuki 416, Jones, Williams, and/or one or more references charted in Exhibit F4 Secondary-008

It would have been obvious to combine these references for reasons that are readily apparent to one of ordinary skill in the art, and for reasons explained herein.

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Respectfully submitted,

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CERTIFICATE OF SERVICE

Pursuant to Local Rule CV-5(c), the undersigned certifies that a true and correct copy of the foregoing document was served upon counsel for record via email on January 13, 2022.

/s/ M. Scott Stevens
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